Semi-Dynamic Datum of Indonesia

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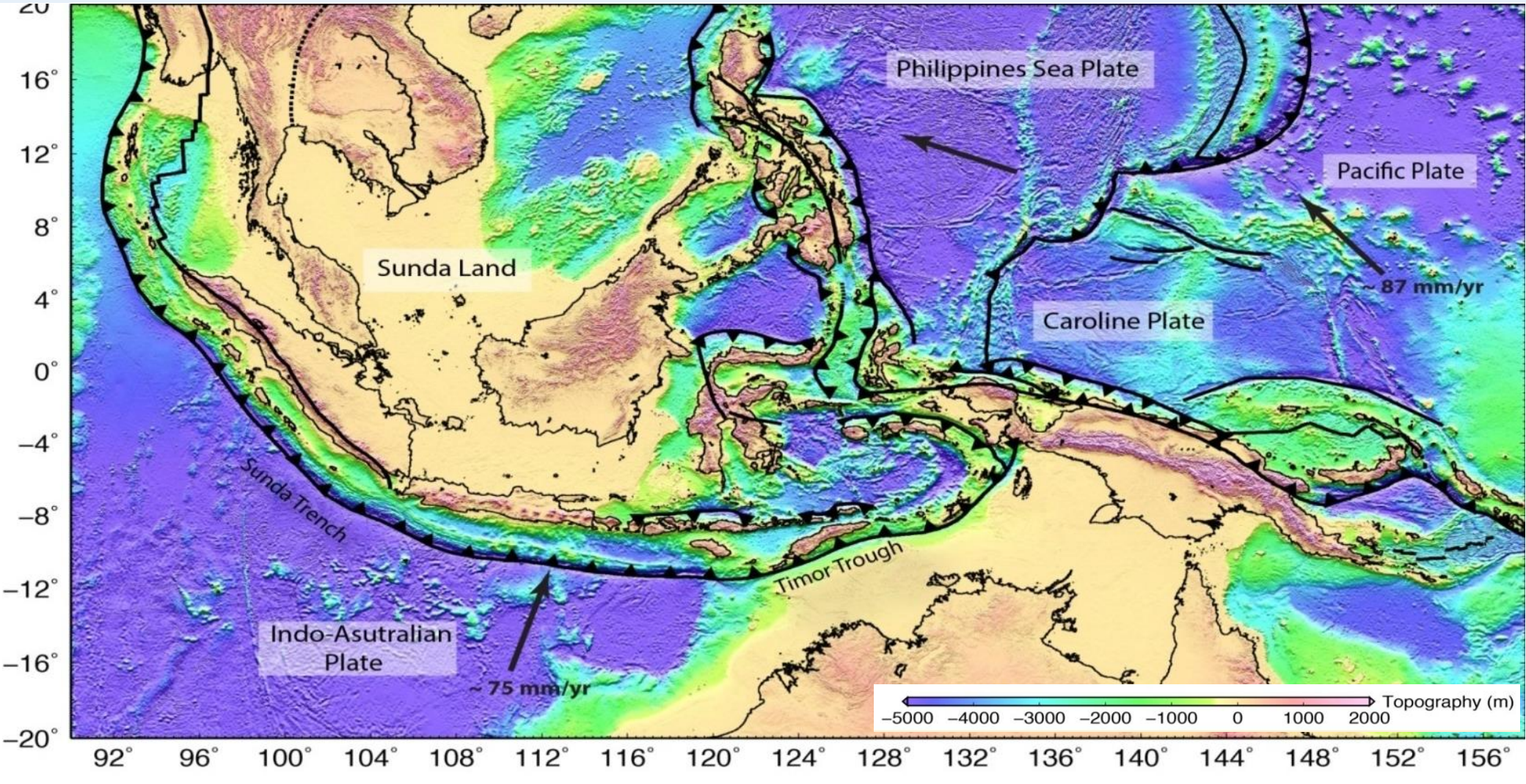
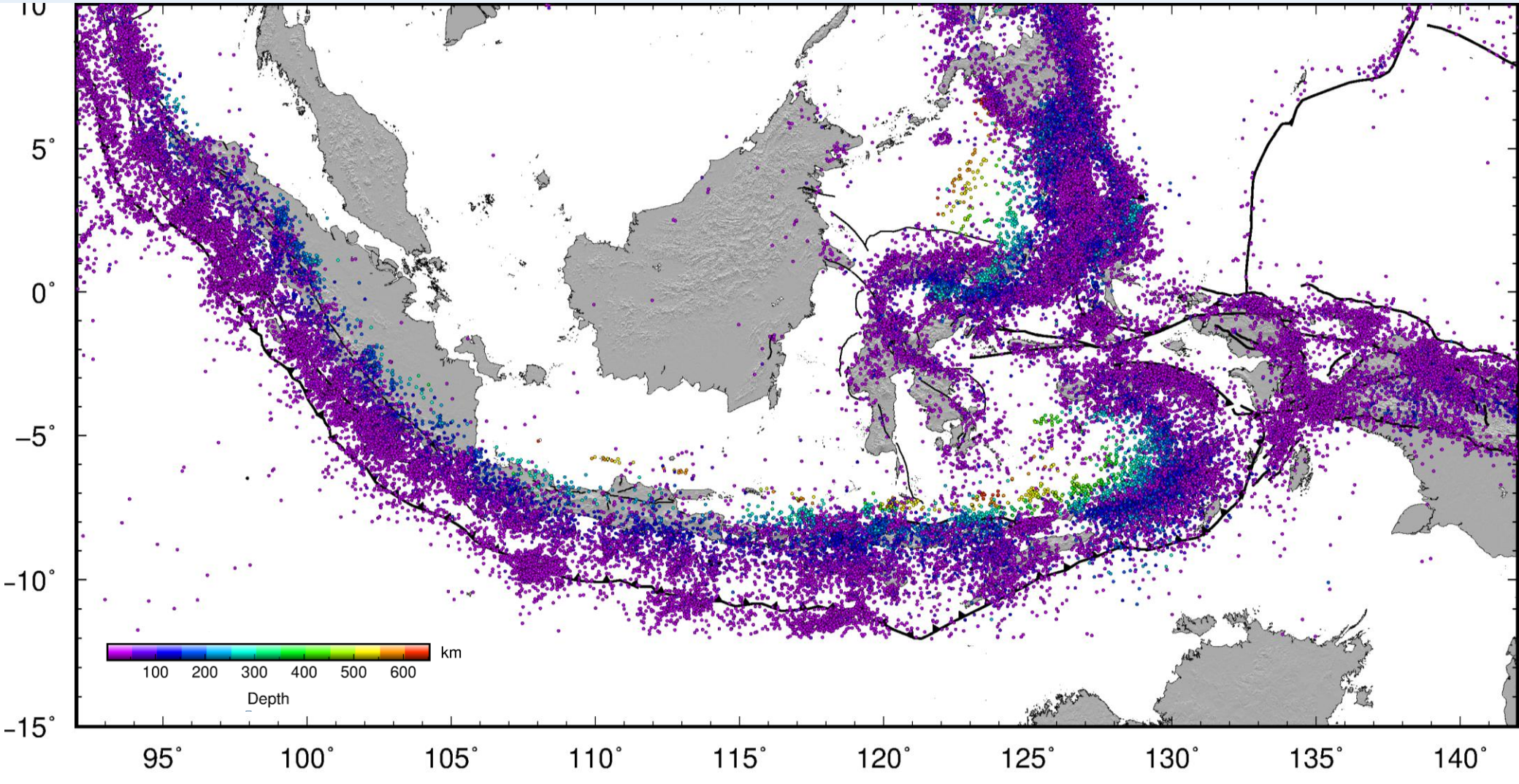
Regional Tectonic of Indonesia



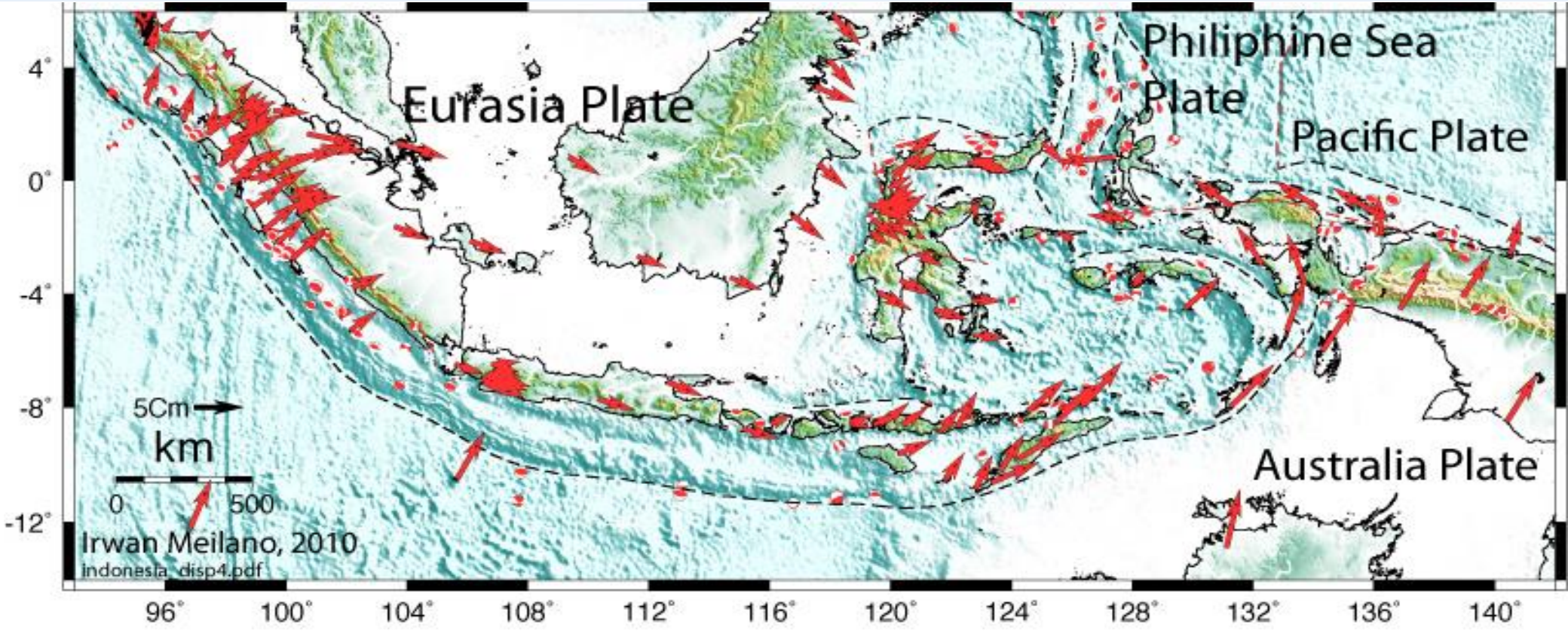
Intersection of 3 major plates, wide range of tectonic environments, including island arc volcanism, subduction zones, and arc-continent collision

Seismicity of Indonesia Region



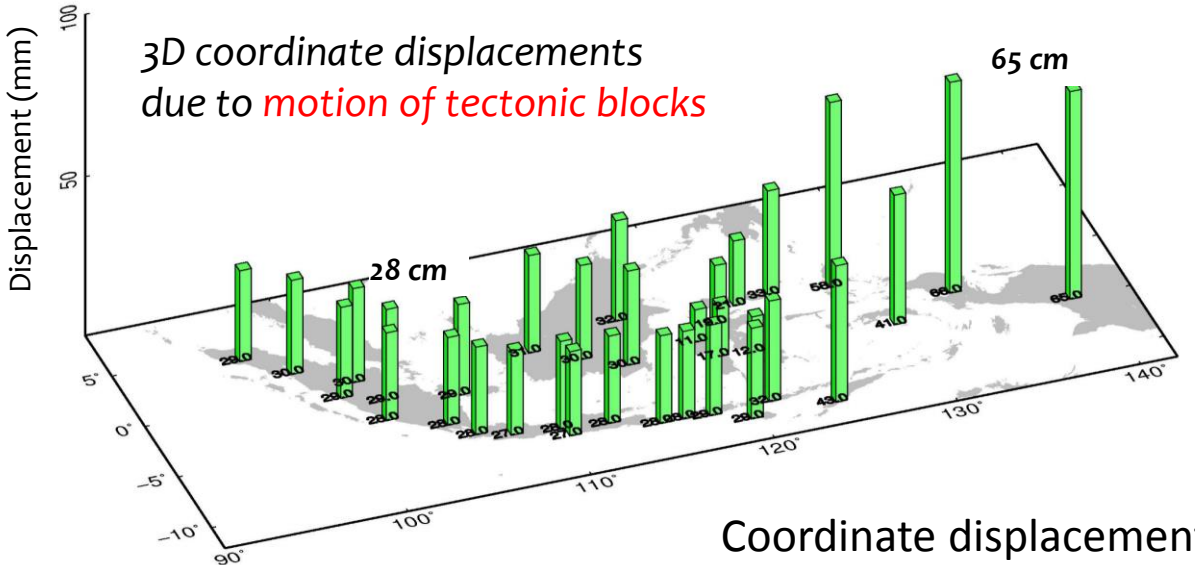
High seismicity, shallow EQs mostly confined at the subduction zone

Tectonic Complexity (Displacement)

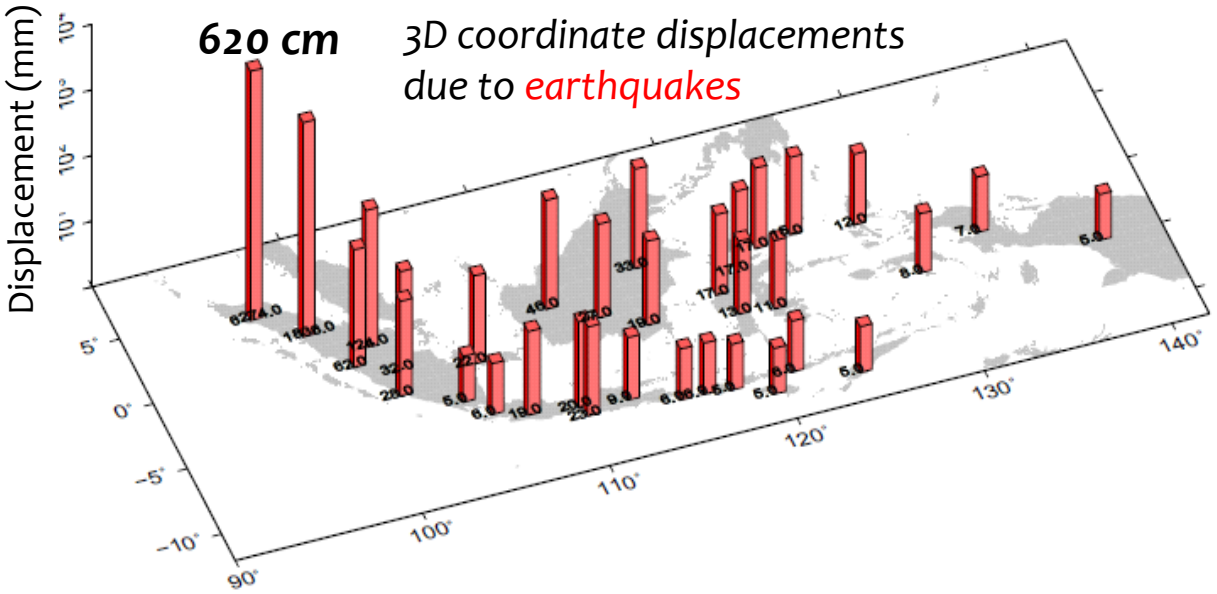


Data : Stevent et.al.,[1999/2000], Nugroho et.al., [2000]. Bock,et.al., [2003] Socquet et.al., [2006], Subarja et.al.,[2007]. Abidin et al., [2007], Meilano et al., [2012]

Coordinates displacements

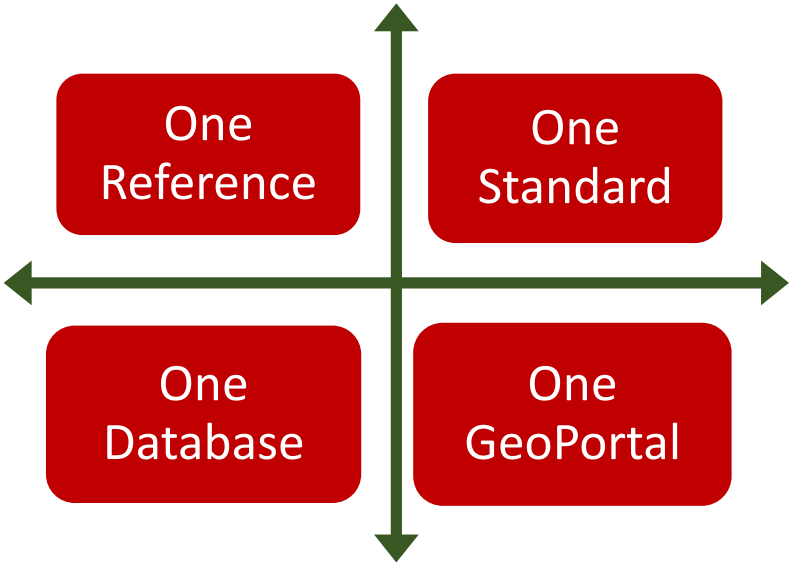


Coordinate displacements due to tectonic block motion since 1996, from GPS observations; courtesy of Meilano (ITB).



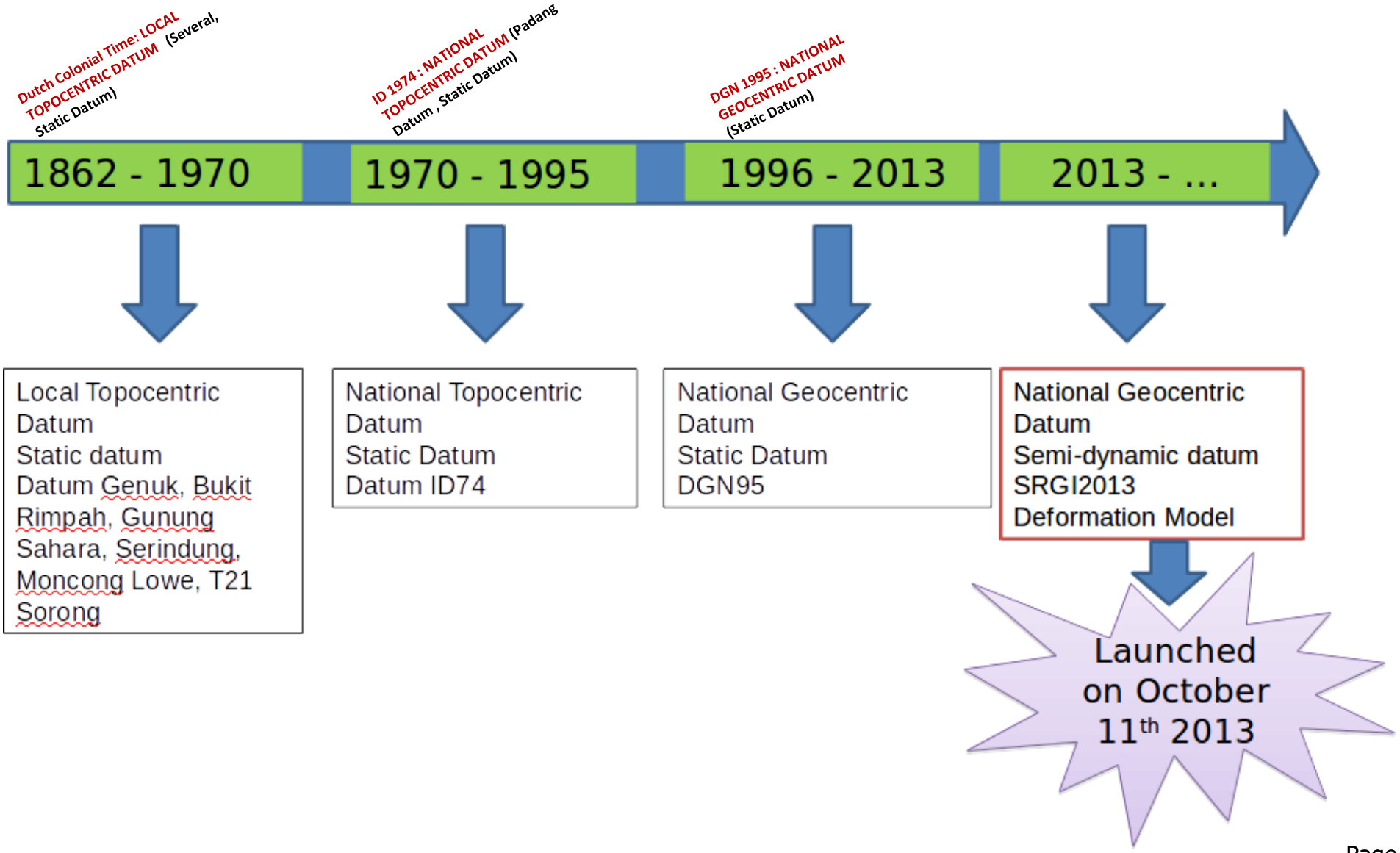
The Need for New Dynamic Datum

A new Geodetic Datum is required to accomodate the active tectonics of Indonesian region, and also to support One-Map Policy of the Indonesian government.



ONE-MAP POLICY

Geodetic Datum



Indonesia Geospatial Reference System 2013

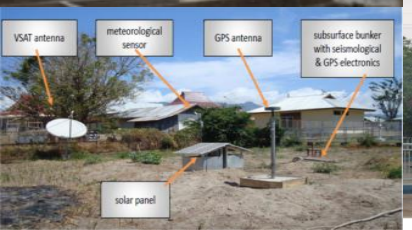
HORIZONTAL

- Semi-Dynamic datum.
- Connected to the global ITRF2008 reference frame.
- Reference epoch: 1 January 2012
- Reference Ellipsoid: WGS 1984 (a = 6378137.0 m; 1/f = 298,257223563).
- If a new version of the ITRF reference frame becomes available, then the IGRS reference frame will also be updated accordingly.
- A velocity model, which incorporates tectonic motion and earthquake related deformation, is used to transform coordinates at an observation epoch to or from this reference epoch.

VERTICAL

- Vertical datum is Geoid.
- The Geoid is derived from the gravity surveys which was tied to National Gravity Control Network (NGCN).
- NGCN has to be connected to the IGSN71 or its new version.
- In case there is no official Geoid yet, the vertical datum is MSL derived from 18.6 years tide observation or at least from 1 year observation.

Realization of IGRS2013

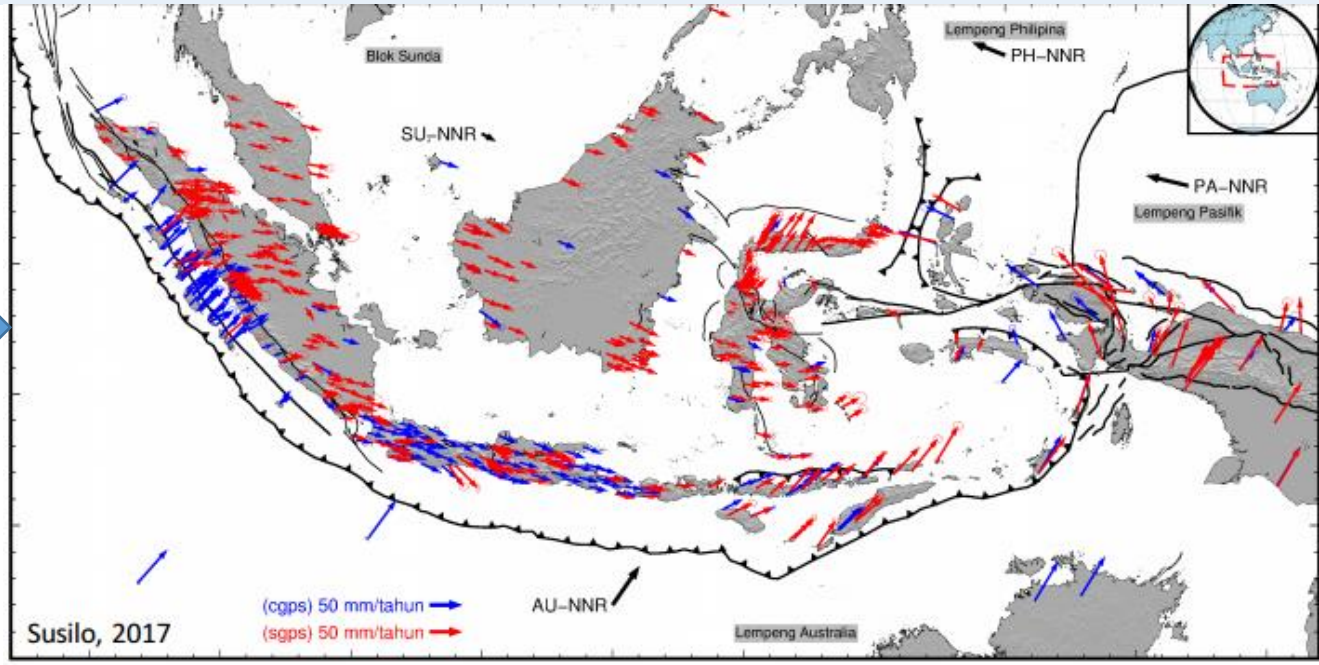


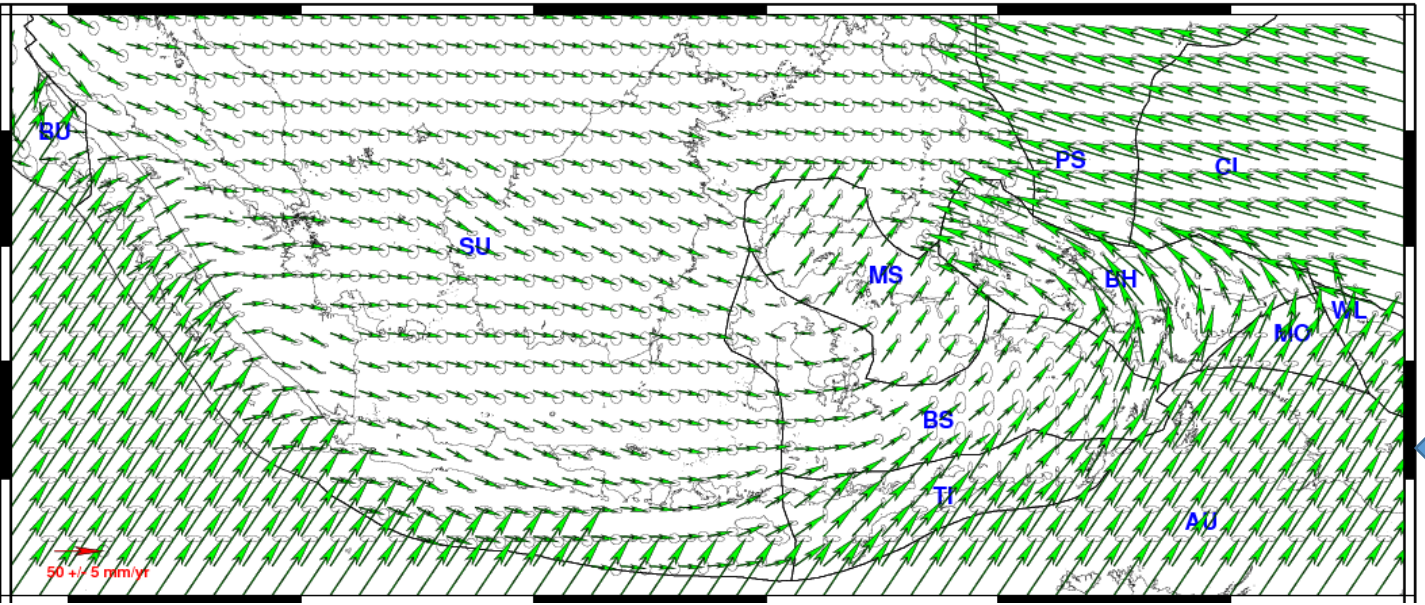
CGPS (134)
sGPS (1254)

Deformation Model

Data: cGPS and sGPS
from 1993 - 2016

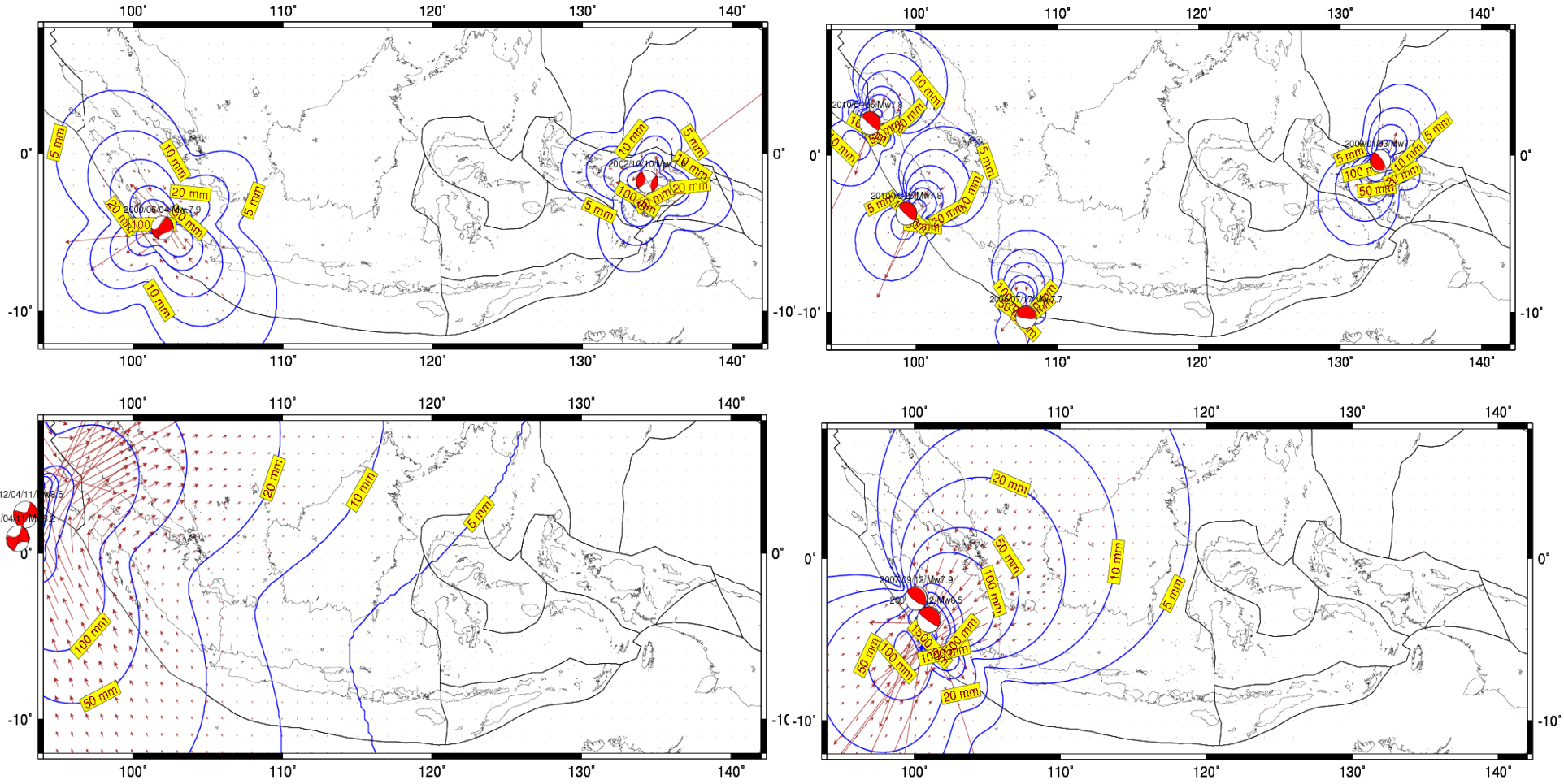
Deformation Model of IGRS2013



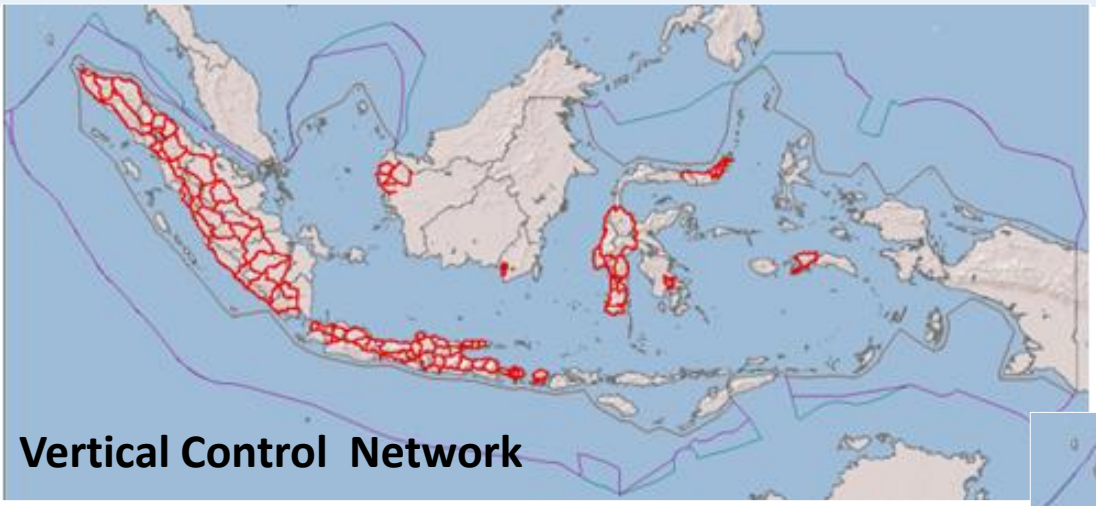


Secular Deformation Model

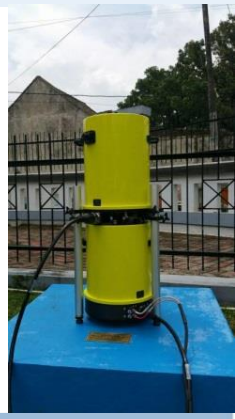
Coseismic Deformation Model

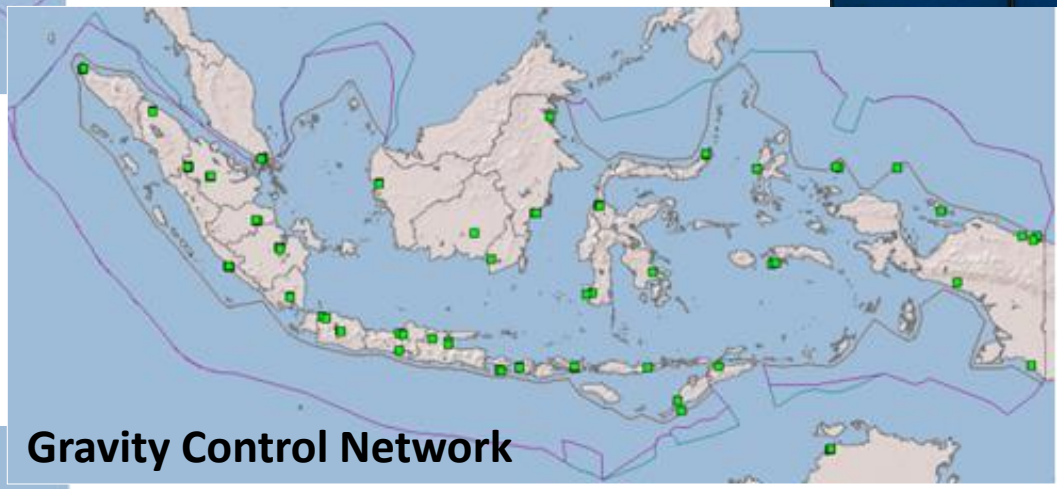


Vertical Reference System

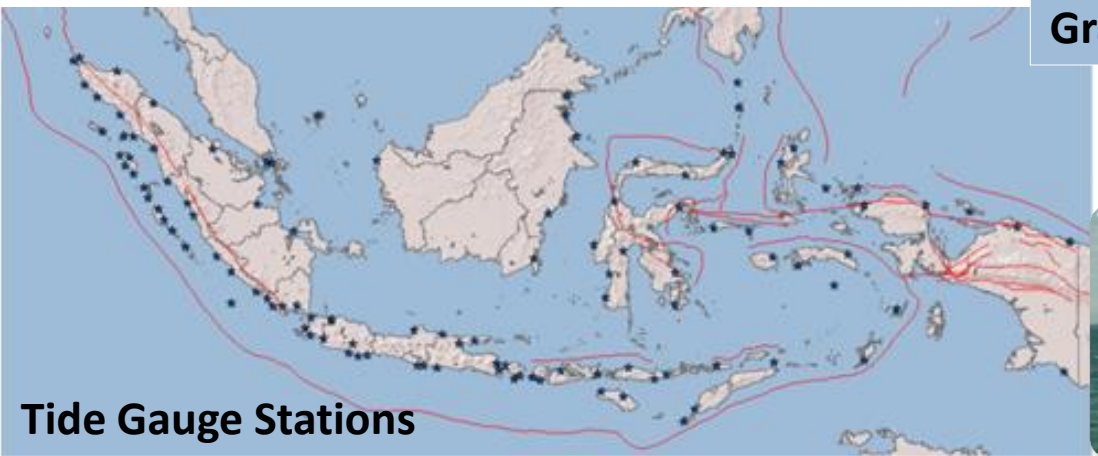


Vertical Control Network





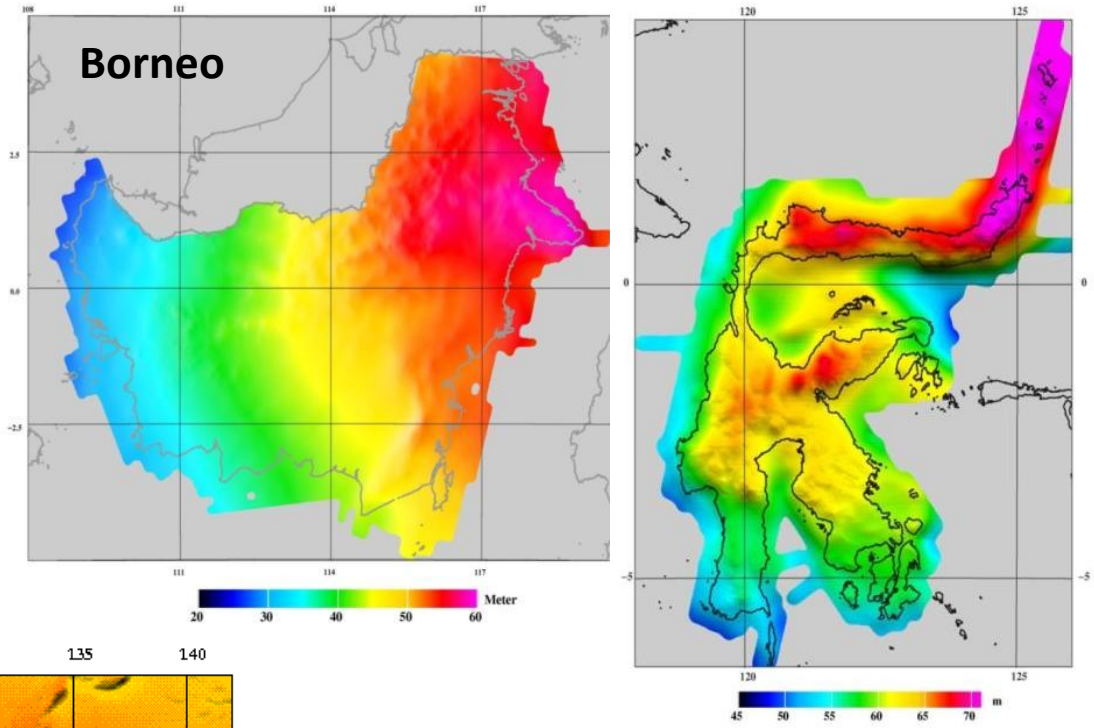
Gravity Control Network

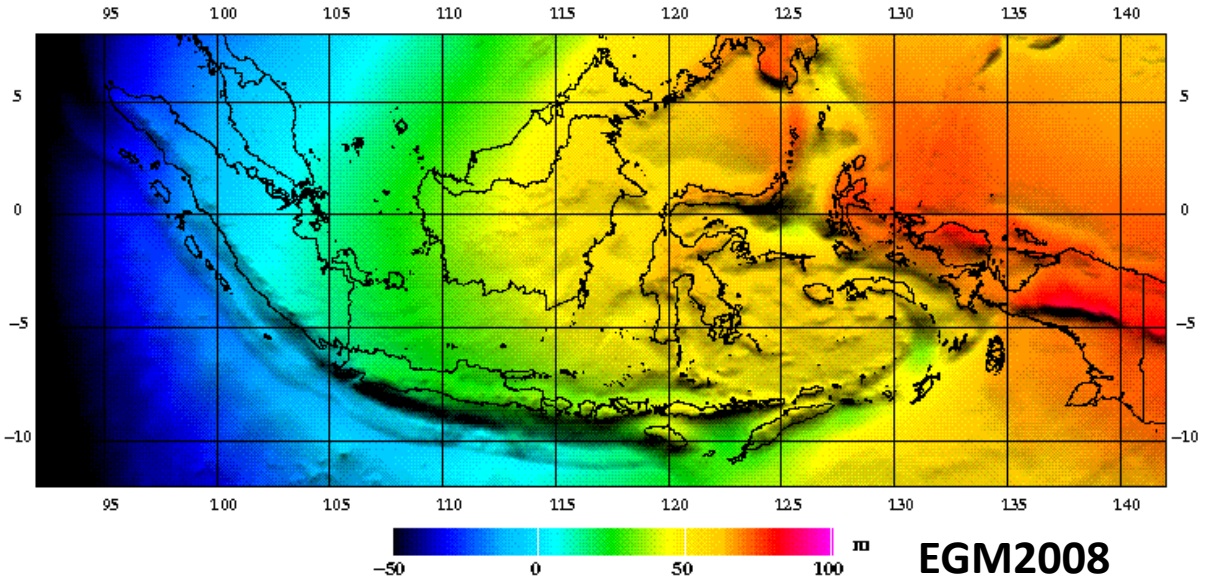


Tide Gauge Stations

Geoid of Indonesia

- Borneo & Sulawesi Geoid derived by airborne gravity measurement conducted by DTU & BIG and need to be validated.
- Papua is still on processing.
- Other islands use MSL or EGM2008 as vertical datum





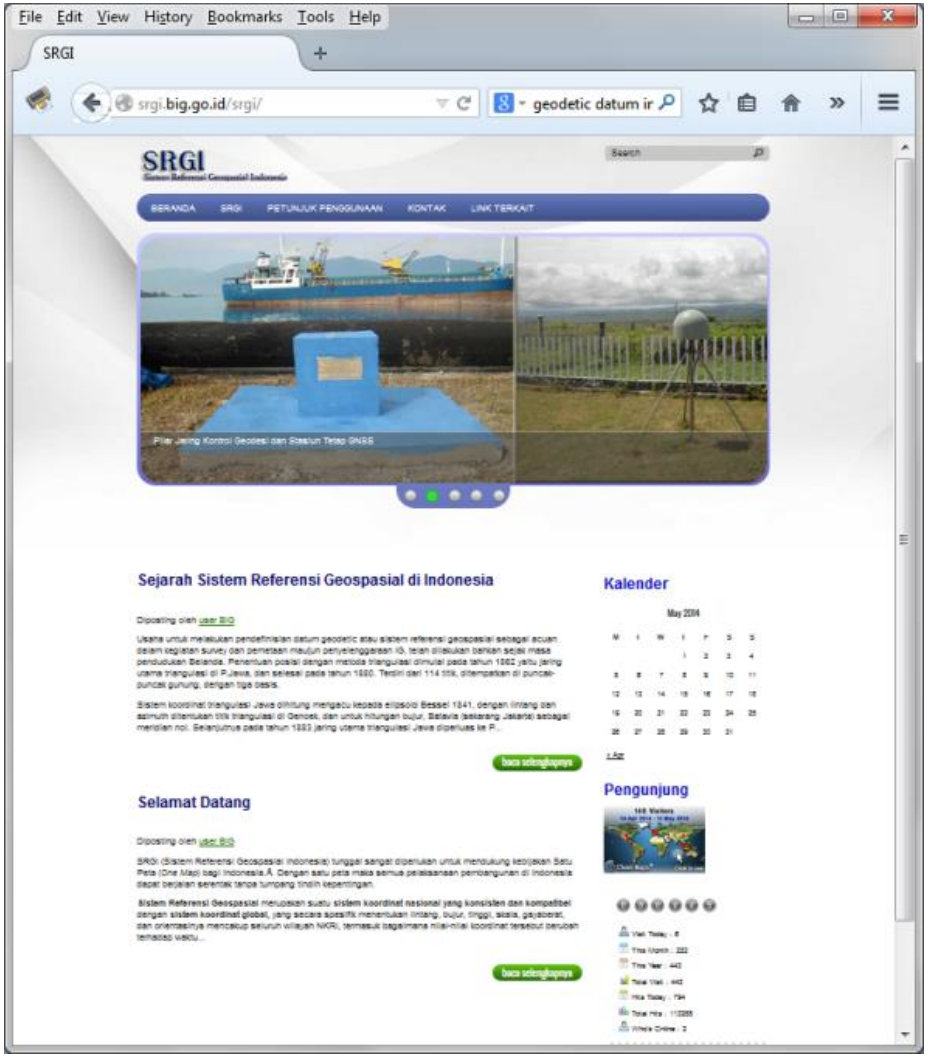
EGM2008

Airborne Gravity Surveys of Java & Sumatra are set for 2018 budget (National Priority)

The rest of Indonesia will be conducted in 2019

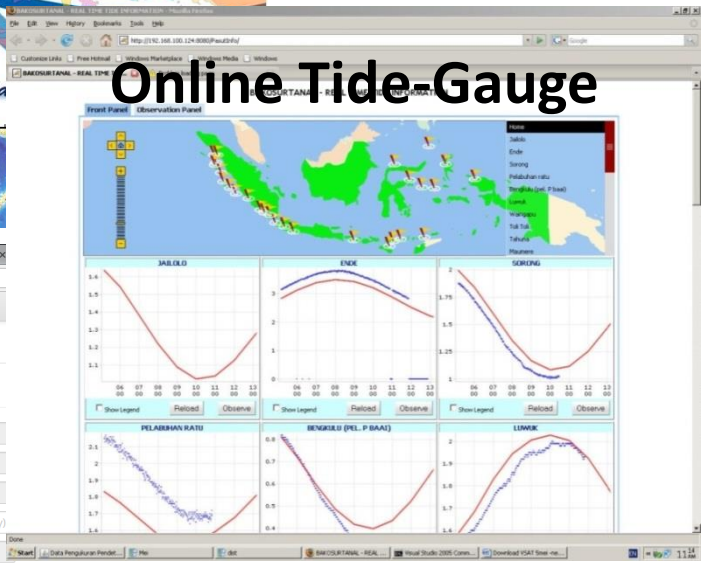
User services and system access

- Web based user services to give easiness accessing SRGI2013
- Type of services:
  - Explanation of SRGI2013;
  - Technical guide;
  - SRGI2013, covering horizontal and vertical datum and historycal aspect as well;
  - Description of control station;
  - Real Time Kinematics service
  - Other facilities supporting SRGI2013 utilization.

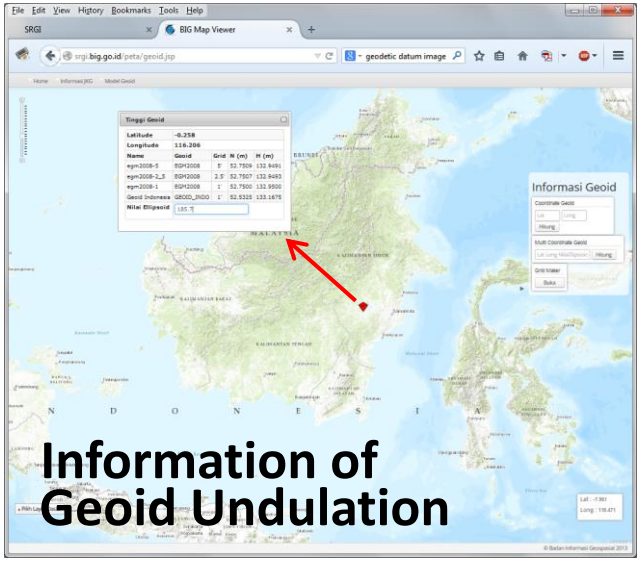


User services and system access

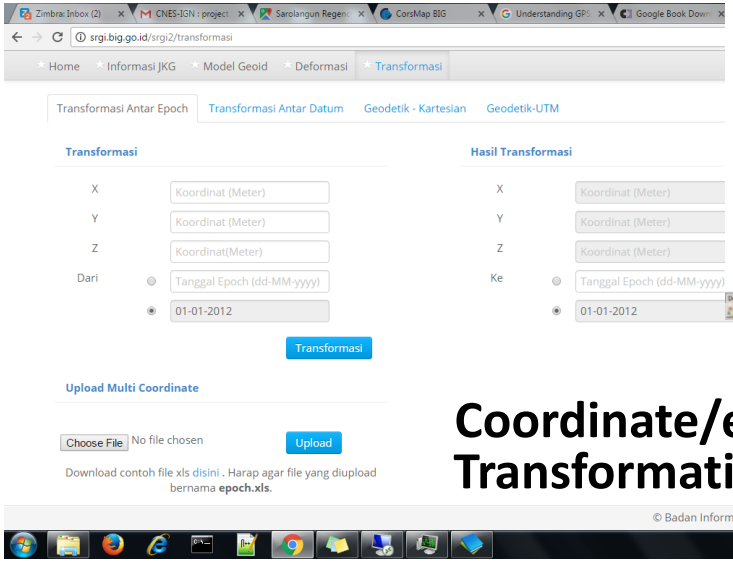
RINEX data &RTK Service



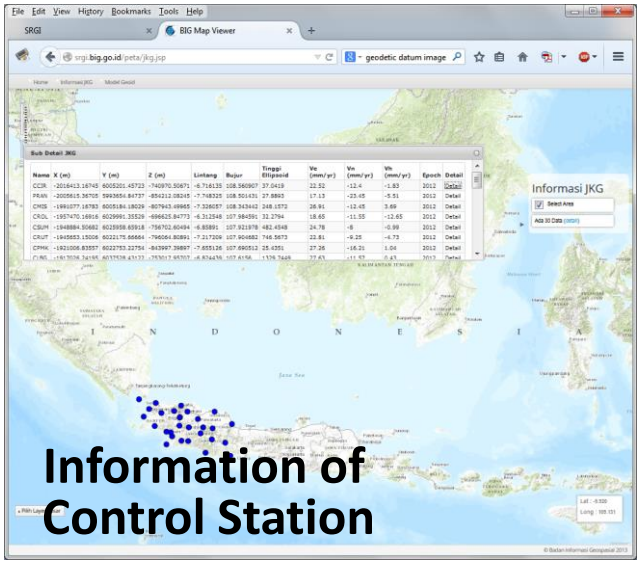
Online Tide-Gauge



Information of Geoid Undulation



Coordinate/epoch Transformation



Information of Control Station

Remarks

- A new semi-dynamic datum for Indonesia was launched in 2013 called Indonesia Geospatial Reference System 2013.
- 3 component of the IGRS2013 are horizontal geodetic datum, vertical datum, and user services and access.
- The horizontal deformation model was developed using GPS observation that consist secular deformation and cosesimic deformation.
- More detail characteristics of the local deformation in Indonesian region is necessary for updating the velocity model of IGRS 2013.
- By the new definition of ITRF2014, the update of IGRS2014 will be initiated
- Geoid as a vertical datum in Indonesia is under development.
- User services and system access still need to be improve

Thank you